Amendments to the Claims:

The following listing of claims replaces all prior versions and listings of the claims in this application:

Listing of the Claims:

1.-43. (Cancelled).

44. (New) A nucleotide vaccine composition comprising a mixture of:

nucleotide sequence encoding an antigen; and

antigen-presenting cells modified for expression of at least one of an immune response modulating molecule and a cell-survival modulating molecule.

45. (New) The vaccine composition according to claim 44, wherein said vaccine composition is provided as pre-incubated mixture of said nucleotide sequence and said modified antigen-presenting cells.

46. (New) The vaccine composition according to claim 44 wherein said antigen-presenting cells are professional antigen-presenting cells.

47. (New) The vaccine composition according to claim 44, wherein said professional antigen-presenting cells are a subclass of dendritic cells.

48. (New) The vaccine composition according to claim 47, wherein said subclass of dendritic cells are plasmacytoid dendritic cells.

49. (New) The vaccine composition according to claim 47, wherein said subclass of dendritic cells are human equivalents to a subclass of dendritic cells that express CD8α, B220, CD11C and B7 molecules in mice.

50. (New) The vaccine composition according to claim 44, wherein said antigen-presenting cells express Toll-like receptor and P2 receptor.

51. (New) The vaccine composition according to claim 44, wherein said antigen-presenting cells can be induced to produce type I interferon-alpha and/or interferon-beta.

52. (New) The vaccine composition according to claim 51, wherein said antigen-presenting cells produce said type I interferon-alpha and/or interferon-beta when interacting with microbes and said nucleotide sequence.

53. (New) The vaccine composition according to claim 44, wherein said antigen-presenting cells are selected from at least one of:

natural-interferon producing cells;

monocytes;

macrophages;

bone marrow derived cells;

cells differentiated from stem cells

B cells;

T cells; and

Mast cells.

54. (New) The vaccine composition according to claim 44, wherein said immune response modulating molecule is encoded by a nucleotide sequence engineered into said antigen-presenting cells, and said gene sequence is selected from at least one of:

cytokine gene;

Interleukin gene;

adhesion molecule gene;

interferon gene; and

chemokine and chemokine receptor gene.

55. (New) The vaccine composition according to claim 54, wherein said immune response modulating molecule is selected from at least one of CD40 ligand and GM-CSF.

56. (New) The vaccine composition according to claim 44, wherein said cell-survival modulating molecule is encoded by a nucleotide sequence engineered into said antigen-presenting cells, said gene sequence is selected from at least one of:

anti-apoptosis gene; and

apoptosis inducing gene;

57. (New) The vaccine composition according to claim 44, wherein said nucleotide sequence is provided in a vector selected from at least one of:

virus vector;

non-viral vector;

plasmid;

microbe-derived vector

liposome; and

small molecule carrier.

58. (New) The vaccine composition according to claim 57, wherein said vector comprises an immune response modulating nucleotide sequence.

59. (New) The vaccine composition according to claim 58, wherein said immune response modulating nucleotide sequence is an unmethylated cytidine phosphate guanosine (CpG) sequence.

60. (New) The vaccine composition according to claim 44, further comprising an immune response modulating nucleotide sequence.

61. (New) The vaccine composition according to claim 60, wherein said immune response modulating nucleotide sequence is an unmethylated cytidine phosphate guanosine (CpG) sequence.

62. (New) The vaccine composition according to claim 44, wherein said antigen comprises at least one of the mini-e1a2 fusion protein of SEQ ID NO: 4, the e1a2 fusion peptide of SEQ ID NO: 5, and an amino acid sequence encoded by the mini-e1a2 fusion gene of SEQ ID NO: 3.

63. (New) A method of producing a nucleotide and cellular vaccine composition comprising the steps of:

providing nucleotide sequence encoding an antigen;

providing antigen-presenting cells modified for expression of at least one of an immune response modulating molecule and a cell-survival modulating molecule; and

mixing said nucleotide sequence encoding said antigen and said modified antigen-presenting cells.

64. (New) The method according to claim 63, further comprising the step of pre-incubating said nucleotide sequence with said modified antigen-presenting cells for enhancing their binding and interaction.

65. (New) The method according to claim 63, wherein said nucleotide sequence providing step comprises the steps of:

providing a MHC-binding antigenic protein or peptide;

cloning said nucleotide sequence encoding said antigenic protein or said antigenic peptide into a said vector; and

propagating said vector in a propagation system.

66. (New) The method according to claim 63, wherein said antigen-presenting cells providing step comprises the steps of:

isolating said antigen presenting cells from a subject; and

engineering said antigen-presenting cells to express at least one of said immune response modulating molecule and said cell-survival modulating molecule.

67. (New) The method according to claim 66, wherein said isolating step comprises the step of isolating a subclass of dendritic cells that expresses Toll-like receptor and has the ability to produce Interferon alpha and/or Interferon beta.

68. (New) The method according to claim 67, wherein said subclass of dendritic cells are plasmocytoid dendritic cells.

69. (New) A method of producing an immune response comprising the step of administering the vaccine composition according to claim 44.

70. (New) A method of treating or preventing a disease in a subject comprising the step of administering to said subject a vaccine composition according to claim 44, said antigen being associated with an agent involved in said disease.

71. (New) The method according to claim 70, wherein said subject is a mammalian subject.

72. (New) The method according to claim 70, wherein said disease is selected from at least one of:

infectious disease;

cancer;

leukemia;

lymphoma;

autoimmune disease/disorder;

inflammation;

blood disease;

allergy;

inherited disease;

transplantation required disease; and

diabetes.

73. (New) A kit comprising nucleotide sequence encoding an antigen and antigen-presenting cells modified for expression of an immune response modulating molecule, provided or used as an inter-mixture.

74. (New) The kit according to claim 73, further comprising an immune response modulating sequence.